

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-948-8000

An Exelon Company

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10 CFR 50.73

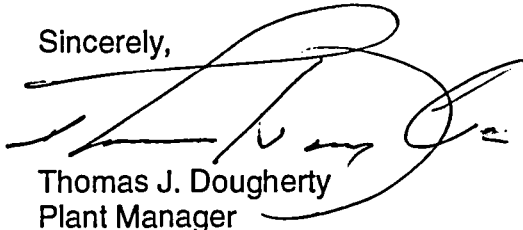
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1)
OPERATING LICENSE NO. DPR-50
DOCKET NO. 50-289

SUBJECT: LICENSEE EVENT REPORT (LER) NO. 2006-002-00
"Automatic Reactor Trip Due to an Invalid Turbine Protective System Actuation"

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(iv)(A). For additional information regarding this LER contact Adam Miller of TMI Unit 1 Regulatory Assurance at (717) 948-8128.

Sincerely,



Thomas J. Dougherty
Plant Manager

TJD/awm

ATTACHMENT: List of Regulatory Commitments

cc: TMI Senior Resident Inspector
Administrator, Region I
TMI-1 Senior Project Manager
File No. 06058

IE22

SUMMARY OF AMERGEN ENERGY CO. L.L.C. COMMITMENTS

The following table identifies commitments made in this document by AmerGen Energy Co. L.L.C. (AmerGen). Any other actions discussed in the submittal represent intended or planned actions by AmerGen. They are described to the NRC for the NRC's information and are not regulatory commitments.

COMMITMENT	COMMITTED DATE OR "OUTAGE"
No regulatory commitments are being made in this submittal.	N/A

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

Three Mile Island, Unit 1

DOCKET NUMBER (2)

05000289

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TITLE (4)

Automatic Reactor Trip Due to an Invalid Turbine Protective System Actuation

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	02	2006	2006	002	00	01	02	2007	N/A	N/A
									FACILITY NAME	DOCKET NUMBER
									N/A	N/A
									FACILITY NAME	DOCKET NUMBER
									N/A	N/A

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
N	100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Adam W. Miller of TMI-1 Regulatory Assurance	(717) 948-8128

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On November 2, 2006, at 1334 hours, the Three Mile Island, Unit 1 (TMI-1) reactor tripped from 100% power during a calibration check of the main turbine Digital Turbine Control System (DTCS) condenser pressure instruments. The reactor trip was initiated from Reactor Protection System (RPS) ARTS (Anticipatory Reactor Trip System) due to a main turbine trip initiated from greater than 45% power. The turbine trip resulted from an invalid DTCS protective system actuation. The turbine trip initiated from the two in-service DTCS protective channels not being tested at the time of the event. Both channels received an invalid trip signal. The channel under test at the time of the event was properly bypassed from the trip logic and did not input a trip signal to the DTCS. Plant systems responded properly to the reactor trip transient and the plant was stabilized at hot shutdown conditions. The root cause of the turbine trip is a latent design weakness within the DTCS. Subsequent testing demonstrated that a short circuit of a single milli-amp input to the DTCS signal processing board will affect all of the processor inputs associated with that board and initiate a main turbine trip signal from the in-service trip channels. All online transmitter preventative maintenance activities that provide inputs to the DTCS trip logic circuit have been suspended until the cause for the turbine trip is eliminated.

The actuation of the Reactor Protection System was reported to the NRC in accordance with 10CFR 50.72 (b)(2)(iv)(B), reference EN# 42957. Submittal of this LER constitutes reporting to the NRC in accordance with 10 CFR 50.73 (a)(2)(iv)(A).

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EVENT DESCRIPTION

Plant Conditions before the event:

Babcock & Wilcox – Pressurized Water Reactor – 2568 MWth Core Power

Date/Time: November 2, 2006/1334 hours

Power Level: 100% steady state power prior to the event

Mode: Power Operations

There were no structures, systems, or components out of service that contributed to this event.

On November 2, 2006, at 1334 hours, the Three Mile Island, Unit 1 (TMI-1) reactor tripped from 100% power during a calibration check of the main turbine Digital Turbine Control System (DTCS) *[JJ] condenser pressure instruments. The reactor trip was initiated from Reactor Protection System (RPS) ARTS (Anticipatory Reactor Trip System) due to a main turbine trip initiated from greater than 45% power. The turbine trip resulted from an invalid DTCS protective system actuation. The turbine trip initiated from the two in-service DTCS protective channels not being tested at the time of the event. Both channels received an invalid trip signal. The channel under test at the time of the event was properly bypassed from the trip logic and did not input a trip signal to the DTCS. Plant systems responded properly to the reactor trip transient and the plant was stabilized at hot shutdown conditions.

The TMI-1 DTCS provides both control and protection functions for the main turbine. Each of the three low-pressure (LP) turbines (A LP Turbine, B LP Turbine, and C LP Turbine) is protected from high backpressure by an automatic turbine trip function.

In 2001, this protective function was modified to increase trip margin during summer months via a variable trip setpoint for loss of condenser vacuum. The turbine trip is now initiated based on a load dependent variable, instead of a fixed pressure setpoint. Absolute pressure transmitters were installed for pressure monitoring in the exhaust hoods of each LP turbine instead of pressure switches. The DTCS inputs were changed from contact inputs to milli-amp inputs.

The initial condenser backpressure milli-amp transmitter calibrations were performed during the 2001 modification, coincident with a refueling outage. The transmitters were next calibrated with the plant on line in June 2004, with no impact on the main turbine trip logic. No other corrective or preventive maintenance had been performed on any of the condenser backpressure transmitters since they were installed during the 2001 modification.

On November 1, 2006, maintenance technicians performed an event-free calibration of the three A LP Turbine exhaust hood pressure transmitters. On November 2, 2006, technicians began calibration of the B LP Turbine exhaust hood pressure transmitters. As the technicians connected the test lead to one of the three B LP Turbine backpressure transmitters to be calibrated, the DTCS trip logic circuit received invalid trip signals from the exhaust hood high pressure alarm circuits for the two LP turbines not being tested, followed closely by a main turbine trip. The main turbine trip in turn actuated an automatic RPS reactor trip.

The actuation of the Reactor Protection System was reported to the NRC in accordance with 10CFR 50.72 (b)(2)(iv)(B), reference EN# 42957; and submittal of this LER constitutes reporting to the NRC in accordance with 10 CFR 50.73 (a)(2)(iv)(A).

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CAUSE OF EVENT

The root cause of the event is a latent design weakness within the DTCS. Subsequent testing demonstrated that a short circuit of a single milli-amp input to the DTCS signal processing board will affect all of the processor inputs associated with that board and initiate a main turbine trip signal from the in-service trip channels. The connection of the test lead during the transmitter calibration activities most likely resulted in a momentary short circuit on the DTCS input, which initiated the turbine trip from the two in-service trip channels.

ANALYSIS / SAFETY SIGNIFICANCE

The reactor protection system functioned as designed to initiate the automatic reactor trip in response to the trip of the main turbine. There were no engineered safeguard system actuations. The post-trip equipment response was within the expected range, operator response was appropriate, and stable hot shutdown conditions were established. The existing plant risk assessment (PRA) assumptions for turbine trip probability bound this event. The PRA assumes a probability of $2.65E-01$ /yr for turbine trip frequency. This is based on generic industry and plant specific historical turbine trip data. Therefore, this event had minimal safety significance.

This event does not involve a safety system functional failure, which would be reported in accordance with NEI 99-02. All safety-related equipment performed in accordance with design in response to the event.

CORRECTIVE ACTIONS

Immediate and Short Term Actions:

All online transmitter preventative maintenance activities that provide inputs to the DTCS trip logic circuit have been suspended until the cause for the turbine trip is eliminated.

Long Term Corrective Actions:

A DTCS modification is being evaluated to prevent a single short circuit on a milli-amp input from causing a main turbine trip.

PREVIOUS OCCURENCES

There are no previous TMI Unit 1 reactor trips related to problems associated with the turbine digital control system.

* Energy Industry Identification System (EIIIS), System Identification (SI) and Component Function Identification (CFI) Codes are included in brackets, [SI/CFI] where applicable, as required by 10 CFR 50.73 (b)(2)(ii)(F).